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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :

Erland R. Sandstrom et al. : Examiner: M. Patterson

U.S. Serial No. 09/437,554 : Group Art Unit: 1772

Filed: November 10, 1999 :

Docket No. 2160 (FJ-99-36) :

For: INJECTION BLOW-MOLDED :
DISPOSABLE TUMBLER AND :
METHOD OF MAKING SAME :

DECLARATION OF ERLAND R. SANDSTROM

Sir:

Erland R. Sandstrom, a co-inventor in the above-noted patent application, hereby declares that:

1. He was awarded a Bachelor's Degree in Chemical Engineering more than thirty (30) years ago from the University of Wisconsin. Since that time he has worked on numerous projects involving disposable products made from or incorporating polymeric materials such as paper products with polymer coatings and plastic products made from polystyrene, polyethylene, polypropylene, polyethylene terephthalate and the like. Over the course of this experience he has become familiar with fabrication techniques for polymer materials such as thermoforming, injection molding, injection blow-molding, injection stretch blow-molding and so forth.
2. That he is familiar with the Official Action finally rejecting the claims of the above-noted patent application dated October 18, 2002, as well as United States Patent No. 5,433,337 to *Willbrandt* which is the primary basis for the rejections made over prior art.

3. *Willbrandt* '337 makes reference to injection molding, blow-molding, vacuum forming, stretch molding and states that injection molding is a preferred method of making the cup illustrated in the '337 patent. Col. 5, lines 29-35. The injection blow-molding process used to make the cups of the above-noted patent application is not mentioned. A brief summary of the various processes used to make plastic cups is given below because the recognized differences between the processes and the products so made are believed pertinent to the invention of the above-noted patent application.
4. With respect to plastic disposable cups, in general, one of skill in the art recognizes that injection molded disposable cups, injection blow-molded disposable cups, blow-molded disposable cups such as stretch blow-molded disposable cups, and thermoformed disposable cups are distinct products with different structural attributes.
5. Injection molded cups may readily be prepared with different thicknesses in different areas, as described in the '337 *Willbrandt* patent noted above. These cups are generally prepared by injecting molten plastic into a mold under high pressure and are characterized by a high degree of uniaxial material orientation in the direction of material flow in the mold. That uniaxial orientation is a structural feature which increases strength in the machine direction and results in brittleness in the cross-machine direction.
6. Injection blow-molded cups, such as those of the invention, are prepared in a multistep integrated process by injecting molding a parison and then blow-molding the hot parison with a compressed gas into the desired final shape. The parison is expanded in a radial, but not axial direction. The step of blow-molding the hot parison imparts biaxial orientation to the final product. Biaxial orientation is a structural feature related to the ratio of the volume of the final product to the volume of the parison and imparts toughness to the article as taught in the above-noted patent application.
7. Stretch blow-molding and blow-molding processes typically involve injection molding a parison in an injection molding machine followed by removing the parison from the apparatus and blow-

molding the parison in a separate apparatus, unlike the injection blow-molding process described above which is an integrated process. Stretch blow-molded and blow-molded products often have a very high degree of biaxial orientation because the parison is expanded in an axial as well as radial direction, but typically require neck features such as prominent annular ring to hold the parison in place during the blow-molding step.

8. Thermoformed articles are generally of relatively uniform thickness because they are prepared from sheets of thermoplastic material, vacuum formed into a mold, for example. Thermoformed articles are generally of relatively uniaxial polymer orientation like injection molded articles in many respects.
9. The cup illustrated in Figures 1-4 of the '337 patent has certain thickness requirements of the various parts of the cup. In this respect, Claim 1 of the '337 patent is illustrative:
 1. A container for a vehicle cup holder comprising:
 - a base;
 - a lower body portion extending substantially upward from said base, said lower body portion comprising a plurality of fluted sides;
 - a shoulder extending radially outward from said lower body portion;
 - each of said fluted sides comprising a substantially one-dimensional surface, said fluted sides increasing in thickness in an upward direction from about 0.008- about 0.025 inch at said base to about 0.040 inch- about 0.055 inch at a point where said lower body portion meets said shoulder, said lower body portion having a length of about 1-7/8 to about 2½ inches; and
 - an upper body portion extending substantially upward from said shoulder to create an opening, the upper body portion having a substantially constant thickness of about 0.030 to about 0.040 inches, said upper body portion increasing in diameter as it extends upward, said upper body portion having a length of about 4.500 to about 5.250 inches, said upper body portion having an overall greater diameter than said lower body portion.
10. Based on his experience, such thickness features, while readily achieved in connection with injection molded products, would be extremely difficult to achieve with other fabrication techniques such as thermoforming or stretch blow-molding and would likely be impossible to achieve in an injection blow-molding process because of the inherent complexity of the process. In an injection blow-molding process, thickness features would need to be molded into the

parison, followed by blow-molding the product while the parison was still hot enough to be formed into shape. Because thick portions take longer to heat and cool, it is unlikely, in his opinion, an injection blow-molding process could be employed to make the cup illustrated in the '337 *Willbrandt* patent. The various thicknesses would lead to temperature differences which would lead to uncontrolled stretching of the parison when it was expanded in a blow mold.

11. The cups or tumblers of the present invention are of the injection blow-molded variety as is seen from amended Claim 1 of the above-noted application:

1. An injection blow-molded tumbler formed from a polymeric material comprising:
 - (a) a base defining a base diameter forming the bottom of said tumbler, the base also defining an outer edge thereof;
 - (b) a sidewall integrally formed with said base extending upwardly from the outer edge thereof defining about its upper extremity an opening having a diameter generally larger than the base diameter provided with a fortified rim integrally formed with the sidewall in the form of a continuous solid polymer bead;

wherein said fortified rim has a thickness from about 1.5 to about 6 times the thickness of the adjacent portion of said sidewall and wherein the volume of the injection blow-molded tumbler is from about 1.5 to about 4 times the volume of an injection molded parison from which it was prepared.

12. There are at least three aspects to the claimed subject matter above which involve unexpected and, in my opinion, surprising, results. First, the cups of the invention were found to decrease "lip feel" negatives to a surprising degree over prior art injection blow-molded cups. Second, the cups of the invention are surprisingly impact-resistant as compared with prior art injection blow-molded cups. Finally, the cups of the invention with a compact, solid brim, were unexpectedly suitable for the injection blow-molding process. The process is basically that described in United States Patent No. 4,540,543. The integrated injection blow-molding process is readily distinguished from other blow-molding techniques for making cups due to the requirement that the parison must be retained in place by its brim.

13. With respect to the data which follows, the cups tested were 16 oz. cups as shown generally in Figure 8 of the above-noted application. The cups of the invention tested had a 63 mil (0.063") beaded brim as shown in Figure 4B of the above-noted application and the other cups had a curled, "U" shaped rim as shown in Figure 4A of the above-noted application having a 125 mil wide brim and an 85 mil wide brim. The various geometric features are summarized in Figure 1:

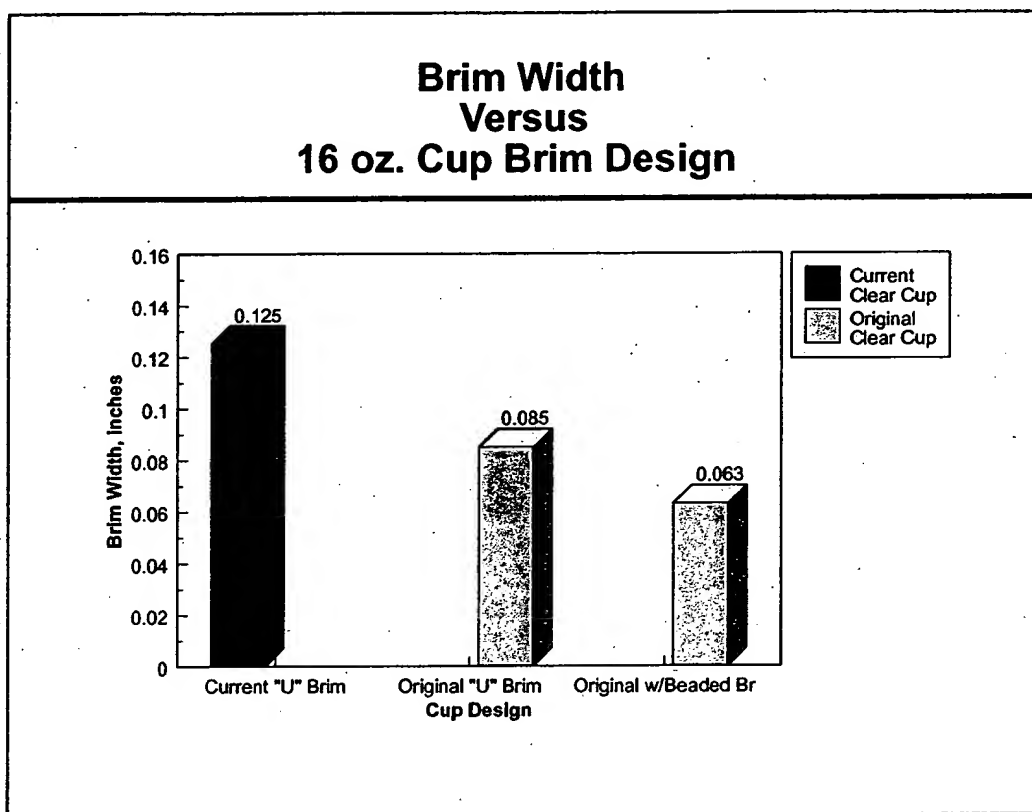


Figure 1

In Figure 1, as well as Figures 2 and 3 below, the cups of the invention are designated "Original w/Beaded Br". Cups with a 125 mil "U" shaped brim are designated "Current "U" Brim" and cups with an 85 mil "U" shaped brim are designated "Original "U" Brim".

14. The cups were compared for "Lip Feel Negatives" using a non-directed panel. These evaluations

were conducted by providing panelists with a cup of water and asking them to drink. Panelists were then asked to comment on anything they liked or disliked about the experience. A Lip Feel Negative was recorded when a panelist remarked that the brim felt uncomfortable or “sharp” on the lips. Oftentimes such remarks were the panelists’ first comments, despite the fact that the panelists were not directed in any way to a feature of the cup.

Results appear in Figure 2 below:

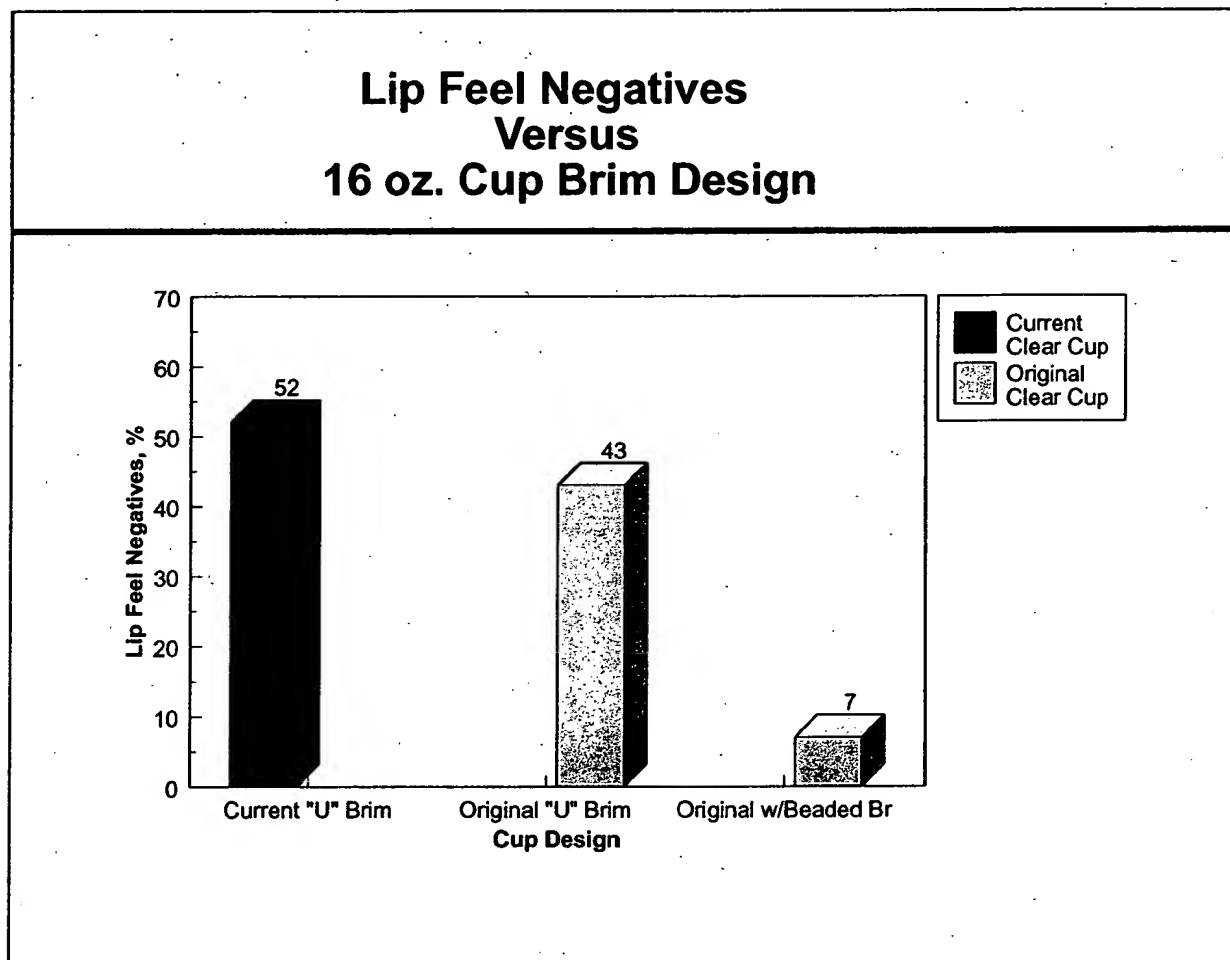


Figure 2

It can be seen in Figure 2 that the lip feel negatives were dramatically reduced by a factor of 6 or more. In my opinion, this is a surprising finding, one which is of significant commercial

significance. Thermoformed cups typically have a fully rolled brim without edges, so that lip feel is less of an issue.

15. The cups were also compared for impact resistance using generally the procedure described in the above-noted patent application at pages 60-61. Results appear in Figure 3.

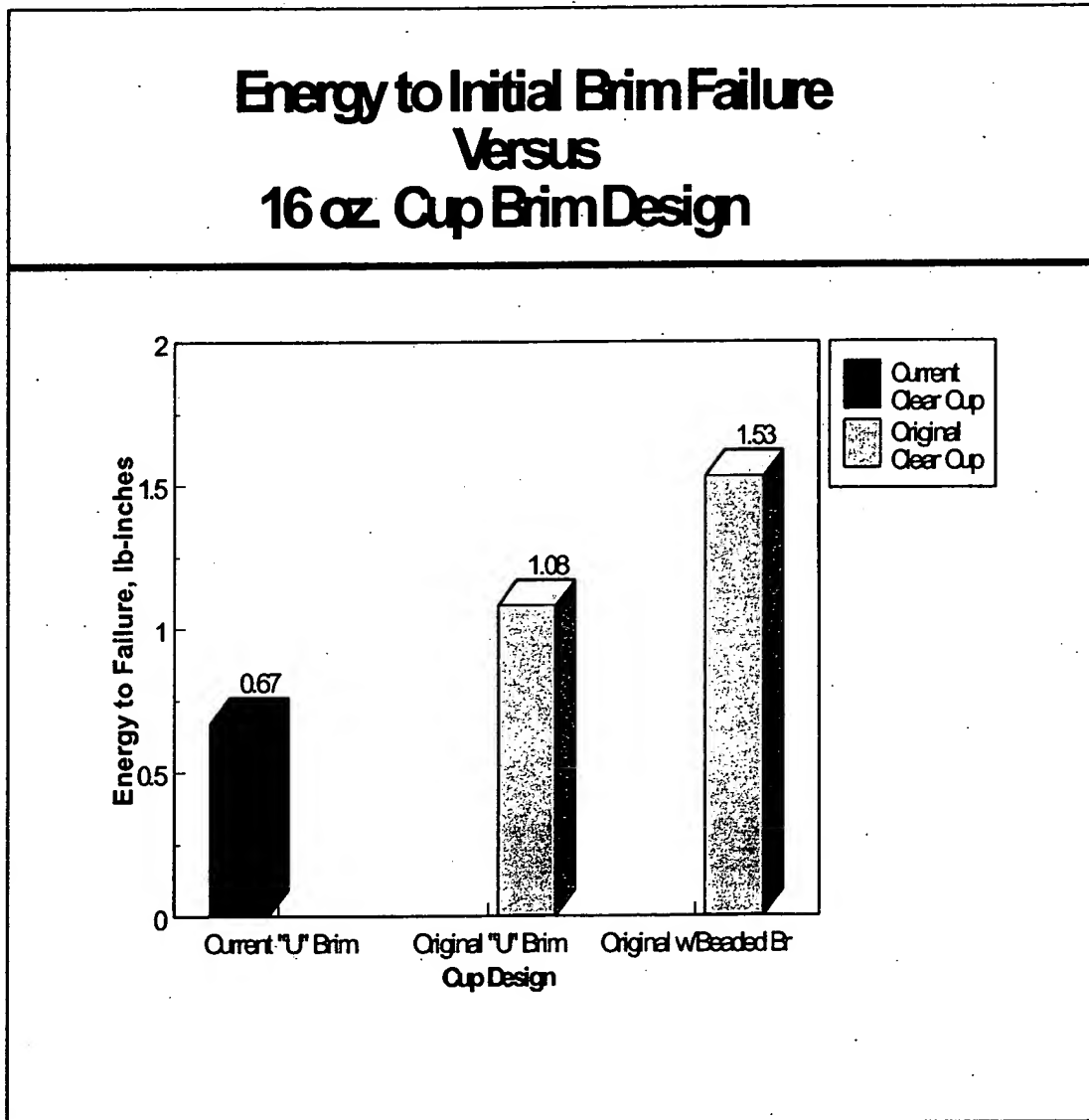
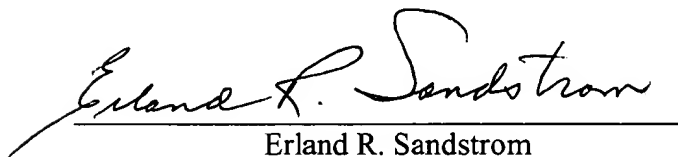


Figure 3

Here again, it is seen that the cups of the invention exhibited an unexpected and surprising increase in impact resistance; more than 100% increase in impact energy at failure versus cups with a 125 mil curled brim. This unexpected result was, in my opinion, surprising. Note also that these results are similar to those initially found and reported in Table 3 of the above-noted application.

16. Another unanticipated result found in connection with the above-noted invention was that the solid rim of much smaller size than prior art "U" shaped rims was sufficient to hold the product in place during the integrated injection blow-molding fabrication process, which is described generally in United States Patent No. 4,540,543. Conventional wisdom was that a "U" shaped curl on the product was necessary in order to hold the product in place during the fabrication process. In fact, engineers and operators of the process told me that a compact, rounded solid rim would not work in the process. In my opinion, the fact that the products of the invention can be made by way of the injection blow-molding without special equipment and without unwanted features to hold the parison in place is an unexpected and surprising aspect of the invention.
17. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Signed this 15 day of January, 2003


Erland R. Sandstrom